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Research Report: ZLC-2006-13
Buffer Planning and Stock Positioning at Lucent Technologies EMEA
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Buffer Planning and Stock Positioning At Lucent Technologies EMEA

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EXECUTIVE SUMMARY

Lucent Technologies faces a rapidly changing market environment for its products, especially its Digital Subscriber Line (DSL) product portfolio. Previously, the telecom equipment market was driven by technology developments and pushed by equipment manufacturers. Whenever they developed new technologies or new features, they could sell them to service providers, who then added bandwidth or newer features in their networks in anticipation of increasing their subscriber bases. Now some of these processes have been reversed. Service providers will only buy equipment from manufacturers when they realize the actual demand from end consumers.

As a response to this new competitive reality and its consumer driven market, Lucent Technologies is initiating many changes to its supply chain structure. In this new situation buffer planning and stock positioning is of crucial importance to guarantee quick response to customer demand at the lowest possible cost. In this thesis we analyzed Lucent's current buffer planning and stock position approach and tried to figure out two distinct areas for improvements.

In order to better understand the key factors and parameters that influence a stock positioning strategy, we first sketched the inter-relationships between buffers and lead times of different stages. Based on an understanding of the relationship of buffers at each stage, we designed a simple approach that considers important factors in deciding buffer levels without necessarily being data or resource intensive.

The following factors are considered in our suggested buffer planning approach

- The monthly forecast provided by customer.
- Historical Accuracy Factor of the forecast from customer
- Program Manager's confidence on the forecast
- Analyst's confidence on forecast from customer
- Safety Stock
- Lead Time at each stage

The complexity and intractability of the mathematical model made it difficult to gain insights

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and trace the effects of any change in the operating policies on overall inventory and order fulfillment. To get around this, we developed a discrete-event simulation model using ServiceModel ® software from Promodel Corporation.

We ran the simulation for different scenarios of demand, forecast and operating parameters. The test cases and data used for the simulation model were based on historical data for a component Comcode:300426673 from Lucent's Stinger product line.

From the analysis of simulation results, we obtained the following insights:

Forecast

An inflated forecast (positive bias) results in better order fulfillment performance as compared to an unbiased forecast or deflated (negative bias) forecast. This increase in order fulfillment is accompanied by higher buffer inventory in the system.

Reorder point

Establishing a reorder point at each stage in the supply chain also plays an important role in order fulfillment performance.

The reorder point approach pulls more buffer inventory to the downstream buffer resulting in quicker response to customer demand. Note that the overall inventory in the system does not increase dramatically under this scenario. Table 1 and Figure 6 depict this for the inventory of the simulated component.

Finally, we recommend the following steps to improve the buffer planning and stock positioning performance at Lucent:

Apply Reorder Point Policy

As seen in the results generated by the discrete simulation model, establishing a reorder point at each stage can substantially improve order fulfillment while increases overall buffer levels only marginally.

Utilize Forecast Confidence in Buffer Stock Computation

We suggest utilizing the confidence attached to the forecast by various parties involved in the buffer planning process. A simple and illustrative model to do this is included in the report. According to the qualitative analysis and results from the discrete simulation model, we note that more accurate forecast can enhance order fulfillment performance without substantially increasing buffer levels.

These results and recommendations should be viewed in light of the limitations and assumptions of this study. Owing to the strict time- constraint the following modeling assumptions were made some of which are perhaps not too-realistic:

- In the simulation model, we modeled the Stinger supply chain as a single-item flow, ignoring any bill of material and order structure relationships.
- We assumed demand to be stationary and without any seasonal or strong trend components
- We assumed un-capacitated lead-times at each stage (as is used in Lucent's current buffer planning approach). If capacity at each stage is tight or constrained, the lead-

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time would depend on the order size which would affect the validity of the current analysis.

Before proceeding further with these recommendations the implications of these assumptions and further research should be carried out.